

MXLD PHOTOEMISSION AND MXCD ABSORPTION OF MAGNETIC ALLOY ULTRATHIN FILMS; ^AJ.G. Tobin, ^AK.W. Goodman, ^BG.J. Mankey*, ^BR.F. Willis, ^CJ.D. Denlinger, ^CE. Rotenberg, and ^CA. Warwick; ^ALawrence Livermore National Laboratory, Livermore, CA 94550, ^BPennsylvania State University, Physics Department, University Park, PA 16802, ^CAdvanced Light Source, Lawrence Berkeley Laboratory, Berkeley, CA 94720

We have used the magnetic x-ray linear dichroism (MXLD) in angle-resolved photoemission and the magnetic x-ray circular dichroism (MXCD) in x-ray absorption to investigate the magnetic structure of nanoscale alloy films (thickness of about 1 nm) as a function of composition, with full elemental specificity. FeNi and FeCo films were grown using MBE techniques¹ upon the surface of Cu(001). The MXLD measurements were made at the Spectromicroscopy Facility² of the third generation Advanced Light Source. The MXCD experiments were performed using the UC/National Laboratories PRT beamline at SSRL³. While our MXLD work has been built upon the groundbreaking measurements of Roth, et al⁴ and subsequent investigations^{5,6}, our extension to nanoscale alloy films permits a full utilization of a key component of these x-ray based techniques: Elemental specificity. The MXLD results will be directly compared to predictions of a theoretical model⁷ and magnetic moment determinations from MXCD-absorption⁸. Crucial issues such as the Invar effect will be addressed⁹.

This work was performed under the auspices of the U.S. Department of Energy by LLNL under contract number W-7405-ENG-48.

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